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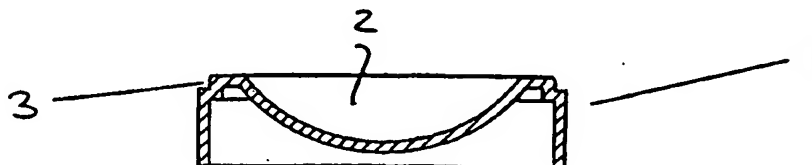
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(54) Title: AN ARTICLE COMPRISING STACKABLE CONTAINERS

## (57) Abstract

There is provided an article (9) comprising at least two stackable containers (1), each stackable container (1) capable of holding an ophthalmic device (8), each stackable container (1) comprising a container portion (2) for receiving an ophthalmic device (8); a first section (4) having engagement means (6); a second section (5) having engagement means; wherein the first section (4) of one of the stackable containers (1) is capable of operably engaging the second section (5) of the other stackable container (1) so that the stackable containers (1) may be releasably joined by means of their respective first (4) and second (5) sections.



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### AN ARTICLE COMPRISING STACKABLE CONTAINERS

The present invention relates to an article comprising at least two stackable containers each of which may contain an ophthalmic device. The present invention relates to a  
5 stackable container for use in an article as described.

For very many years, contact lenses have been provided in place of spectacles to correct imperfect human vision.

10 Until recently, owing to expense, a patient would be provided with a pair of lenses (one for each eye) which could be used repeatedly. To maintain the hygiene of these repeated use lenses, the users have to purchase and apply numerous cleaning products. This is inconvenient for the user both in terms of the cost and the time involved. Failure to correctly clean the lens may result in bacterial growth and  
15 damage to the lens, irritation to the eye or possibly even damage to the eye.

Because of the above problems, there has been a demand for "single use" or "daily disposable" contact lenses. As the name implies, these lenses are used for a short amount of time and are then disposed of. The user then uses a new pair of lenses.  
20 Thus, the need to clean contact lenses may be avoided.

As will be appreciated, by using daily disposable contact lenses rather than a repeated use lens for a year, a user will require hundreds of lenses in contrast to the previously required two or four lenses.

25

For the reasons described above, any lens which is to be placed on the eye must be substantially free of bacterial contamination. Thus, it has been a problem in the art to provide a packaging for dispensing the large quantity of lenses required for daily use in a manner which minimises the possibility of bacterial contamination and also  
30 minimises the cost of the packaging. The cost of packaging is a considerable proportion of the cost of producing and providing a user with a lens. In order to make daily disposable lenses attractive to consumers it is important to minimize the

cost of the lenses.

The prior art has addressed these problems by providing lenses packaged in "blister packaging". Such packaging is used for lenses marketed by Vistakon, Bausch & Lomb (B&L) and Ciba Vision.

This type of prior art packaging has been simplified and the expense thereof reduced by Award plc (a subsidiary of Bausch & Lomb) by using the casting mould of the lens as the base of the blister packaging.

10

However, blister packaging has a number of disadvantages. Specifically, it is very bulky - a small number of lenses may only be contained in a manageable sized pack.

Furthermore, to remain economic, blister packaging is produced in strips and then packaged as several strips in a box. Thus, individual lenses may not be dispensed without destroying the overall package of the box or without cutting the strip. Cutting the strip risks damaging the blister pack and causing bacterial contamination. Furthermore, blister packaging can be difficult to open in a controlled manner. On peeling the seal of the pack, the lens or the fluid in which it is emersed may be thrown from the pack. Furthermore, practitioners are extremely reluctant to sell low numbers of lenses from such a pack because the remainder of the pack is then rendered unsaleable.

The present invention seeks to overcome the problems associated with packaging with blister packs, in particular the packaging of contact lenses.

According to a first aspect of the present invention, there is provided an article comprising at least two stackable containers, each stackable container capable of holding an ophthalmic device, each stackable container comprising a container portion for receiving an ophthalmic device; a first section having engagement means; a second section having engagement means; wherein the first section of one of the stackable containers is capable of operably engaging the second section of another or

the other stackable container so that the stackable containers may be releasably joined by means of their respective first and second sections.

According to a second aspect of the present invention, there is provided a container  
5 for use in an article as described above wherein the container comprises a container portion for receiving an ophthalmic device; a first section having engagement means; and a second section having engagement means.

The present invention is advantageous as it overcomes the afore-mentioned problems  
10 associated with the prior art. In particular, the article provides densely packed storage for the ophthalmic devices contained therein.

Furthermore, one or more containers may be removed and dispensed. This second feature is very advantageous in that when containing, for example, contact lenses it  
15 allows for a dispensing practitioner to dispense a low quantity of lenses. A practitioner may dispense a few or even a single lens or pair of lenses for a trial use e.g. to a new user or to a user considering switching to a new type or brand of lens. Alternatively, the practitioner may wish to dispense a low number of lenses for a specific use e.g. a tinted lens on a sunny day. This is in contrast with the packaging  
20 of the prior art.

In a preferred embodiment the ophthalmic device is a contact lens.

Preferably, the second section of the container is distanced from the first section.  
25

Preferably, the first section of the container is at the top of the container.

Preferably, the second section of the container is at the bottom of the container.  
30

In a preferred embodiment of the present invention, the first and/or second section(s) of the container(s) is/are provided with protrusions or nipples. These allow for an

interference fit between at least two stackable containers. Alternative preferred embodiments means are provided to allow for a twist fit or a snug fit between at least two stackable containers. In yet a further preferred embodiment, the first and second sections are provided such that a snug fit is obtained between at least two stackable  
5 containers.

In a preferred embodiment the wall of the container provides a shoulder. This shoulder may then engage with inner surface of the wall of a similar container so as to provide a releasable join between the two containers.

10

In a preferred embodiment the stackable container is substantially cylindrical. This has the advantage that the containers may be stacked without one having to arrange their orientation before releasable joining.

15 In a yet further preferred embodiment, the wall of the container extends across at least one end face thereof to form the container portion for receiving an ophthalmic device.

Preferably, the container portion for receiving the ophthalmic device is concave.

20

In a further preferred embodiment, the container comprises at least one ridge. If the container is substantially cylindrical this ridge may be annular. The provision of such a ridge increases the rigidity of the container.

25 The container may be formed from any suitable material. Such materials are well known in the packaging industry. In a preferred embodiment, the container is formed from polycarbonate, polysulfone or polypropylene. In a more preferred embodiment the container is formed from polypropylene. This material is easy to handle, is readily available and is cheap.

30

The material should be chosen such that it can withstand the conditions to which the container will be subjected. For example, if the container is to be sterilized by heat

sterilization the material should be chosen to withstand the temperature to which it is to be subjected. Preferably the material should withstand temperatures of greater than about 80°C, more preferably greater than about 100°C, more preferably greater than about 120°C.

5

In a preferred embodiment, the container is formed by injection moulding.

In a further preferred embodiment, the container portion of the container is sealed. More preferably, the container portion is sealed with metal foil or a metal  
10 foil/polymer laminate or a polymer.

In a preferred embodiment the stackable container of the present invention, or at least the top stackable container of the article of the present invention, has removably attached thereto a cover which may seal the container portion. More preferably, each  
15 of the containers of the article of the present invention includes such a cover. Preferably the cover is formed from a polymer, a metal foil or a laminate thereof.

The stackable container may contain two contact lenses, one for each eye of the user.

20 The container may have marking indicating which eye the lens which it contains is to be used for. This is particularly useful when the user has eyes that require a different degree of correction relative to each other.

In a preferred embodiment the container is provided with an indentation which allows  
25 an object e.g. a fingernail to be inserted between the container and any container to which it may be releasably joined. This allows for the containers to be readily separated.

Preferably, the article according to the present invention comprises two or more  
30 stackable containers in a stacked arrangement. In a more preferred embodiment the article of the present invention comprises at least 5, preferably at least 15, more preferably at least 30 in a stack. In this preferred embodiment, a first section of one

stackable container operably engages a second section of an adjacent stackable container.

5 In a preferred embodiment, an article in accordance with the present invention is "shrink-wrapped" - the procedure for achieving this wrapping is well known in the art. In this preferred embodiment it is further preferred that after a repeating increment of containers a perforation in the wrapping is provided to assist in the separation of the containers. The increment may be every 30, 24, 20, 14, 10, 7, 5, 2 or 1 containers or even combinations thereof.

10

In a particular embodiment a container may be capable of allowing inspection, particularly automated inspection, of an ophthalmic device contained therein. In this embodiment, preferably the container portion is transparent to visible light. Moreover, preferably any cover on the container is transparent to visible light. More preferably, both the container portion and any cover are transparent to visible light.

15

The present invention may alternatively be defined as an article comprising at least two stackable containers, wherein each container comprises a cavity suitable for receiving an ophthalmic device and a surface for resistive but removable engagement with at least one other container.

20

A further embodiment of the present invention may alternatively be defined as a stackable container comprising a cavity suitable for receiving an ophthalmic device; a surface for resistive but removable engagement, in use, with a similar container.

25

A further embodiment of the present invention may alternatively be defined as a stackable contact lens container comprising a cavity containing an ophthalmic device and a surface for resistive but removable engagement, in use, with a similar container.

30

The invention will now be described, by way of example only, with reference to the accompanying drawings in which:-



Figure 1 is a container in accordance with the present invention;

Figure 2 is a container in accordance with a preferred embodiment of the present invention;

Figure 3 is a section of a container in accordance with the present invention;

5 Figure 4 is a container in accordance with a preferred embodiment of the present invention;

Figure 5 is a enlarged view of a preferred feature of the present invention;

Figure 6 is a container in accordance with a preferred embodiment of the present invention ;

10 Figure 7 is a container in accordance with a preferred embodiment of the present invention;

Figure 8 is an article in accordance with the present invention;

Figure 9 is an article in accordance with a preferred embodiment of the present invention.

15

Figure 1 illustrates a container 1 in accordance with the present invention. The container comprises a container portion 2 and first section which is an annular ridge or shoulder 3 for operable engagement with a similar container.

20 Figure 2 is a elevation view of a container similar to that of Figure 1. The first section 4 and the second section 5 of the container can be clearly seen. The container also has some further preferred features. These are protrusions 6 for providing and/or enhancing a releasable join with a similar container and an indentation 7 for assisting in the separation of the container to a similar container to which it may be  
25 attached.

Figure 3 is a section of a container 1 similar to that of Figure 1. The container portion 2 and the shoulder 3 may be seen.

30 Figure 4 shows a container similar to that of Figure 2. The container has six protrusions 6 with a separation of approximately 60°.

Figure 5 is an enlargement of a protrusion 6 of Figure 4.

Figure 6 is a container similar to that of Figure 4. The container has four protrusions 6 with a separation of approximately 90°.

5

Figure 7 is a container containing a ophthalmic device, specifically a contact lens 8, in the container portion 2.

Figure 8 is an article 8 comprising five containers in a stacked configuration. The first section 4 of each container, other than the container at the top of the article, is operably engaged with the second section 5 of another container. Similarly the second section 5 of each container, other than the container at the bottom of the article, is operably engaged with the first section 4 of another container. An indentation 7 is provided to assist in the separation of the containers.

15

Figure 9 is an article comprising thirty containers in a stacked configuration.

#### Example

A container was prepared by the preparation of a mould (not shown) defining a cavity having the configuration of the container of Figure 2. The mould was filled with polypropylene using well known injection moulding techniques. The moulded container was removed from the mould.

This process was repeated several times to prepare a number of containers.

A contact lens was dropped into the container portion of each container and a volume of sterile solution, of the type commonly used for contact lens storage, was dispensed into the container portion.

30

A metal foil/polymer laminate sheet was then removably adhered to the periphery of the container portion of each container so as to seal the contact lens and solution

therein.

The containers were then stacked by engaging the first portion of each container with the second portion of the adjacent container and vice versa.

5

Other modifications will be apparent to those skilled in the art.

## CLAIMS

1. An article comprising at least two stackable containers, each stackable container capable of holding an ophthalmic device, each stackable container comprising
  - 5 a container portion for receiving an ophthalmic device;
  - a first section having engagement means;
  - a second section having engagement means;wherein the first section of one of the stackable containers is capable of operably engaging the second section of another or the other stackable container so
  - 10 that the stackable containers may be releasably joined by means of their respective first and second sections.
2. An article according to claim 1 wherein the container portion is sealed.
- 15 3. An article according to claim 1 or 2 wherein the releasable join is provided or enhanced by protrusions on the first section or second section.
4. An article according to any one of the preceding claims wherein the container is substantially cylindrical.
- 20 5. An article according to any one of the preceding claims wherein the container comprises at least one annular ridge.
6. An article according to any one of the preceding claims wherein the container is
  - 25 formed from polypropylene.
7. An article according to any one of the preceding claims wherein the container is formed by injection moulding.
- 30 8. An article according to any one of the preceding claims wherein one or more, preferably all, of the stackable containers has in each respective container portion an ophthalmic device.

9. An article according to any one of the preceding claims wherein the ophthalmic device is a contact lens.
10. An article according to any one of the preceding claims wherein the containers  
5 are in a stacked arrangement (configuration).
11. A container for use in an article as defined in any one of the preceding claims wherein the container comprises
- 10 a container portion for receiving an ophthalmic device;  
a first section having engagement means; and  
a second section having engagement means.
12. A container according to claim 10 wherein each container has ophthalmic device.
- 15 13. An article or container substantially as described herein and with reference to any one of the Figures.

1/5

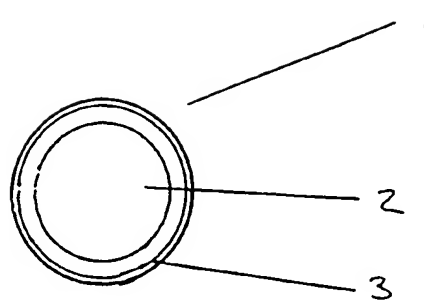


Fig 1

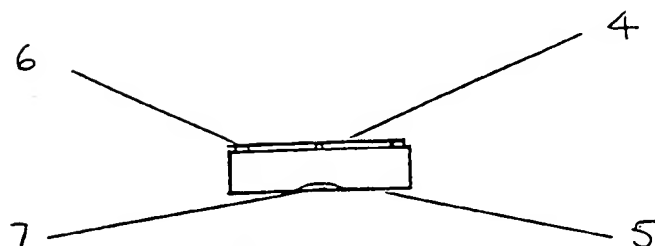


Fig 2

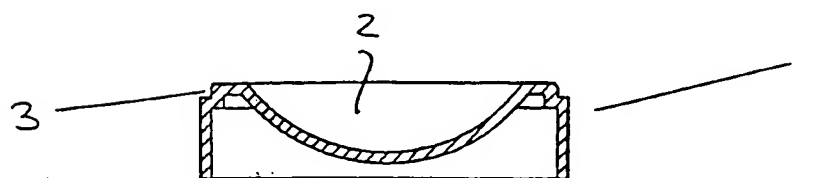


Fig. 3

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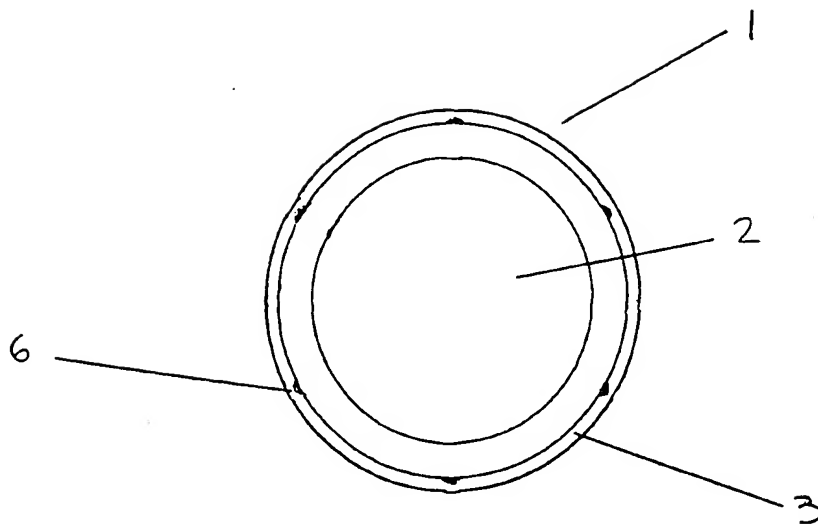


Fig 4

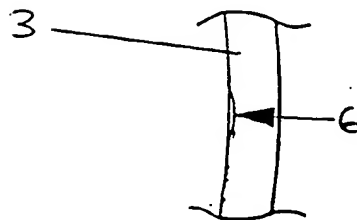


Fig 5

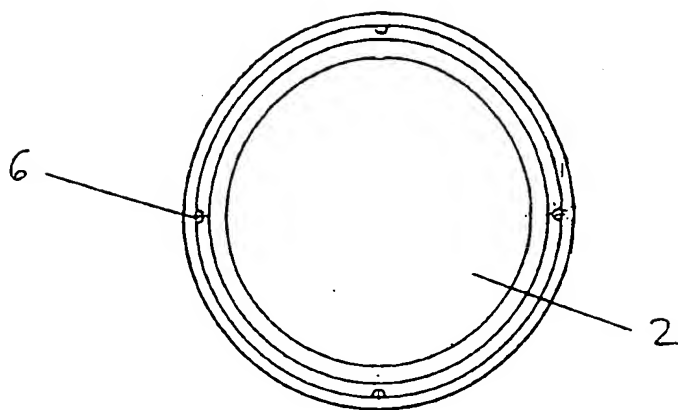


Fig 6



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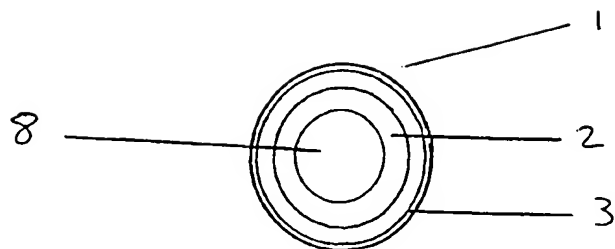


Fig 7

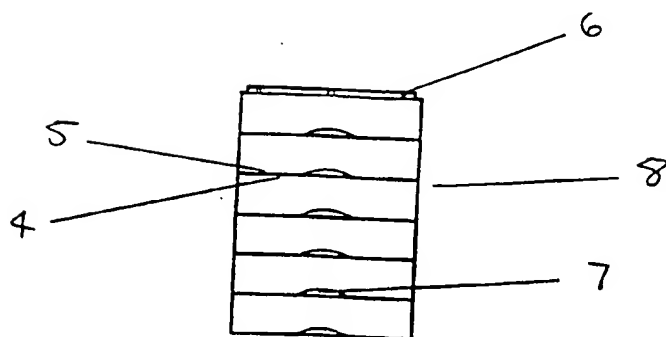


Fig 8

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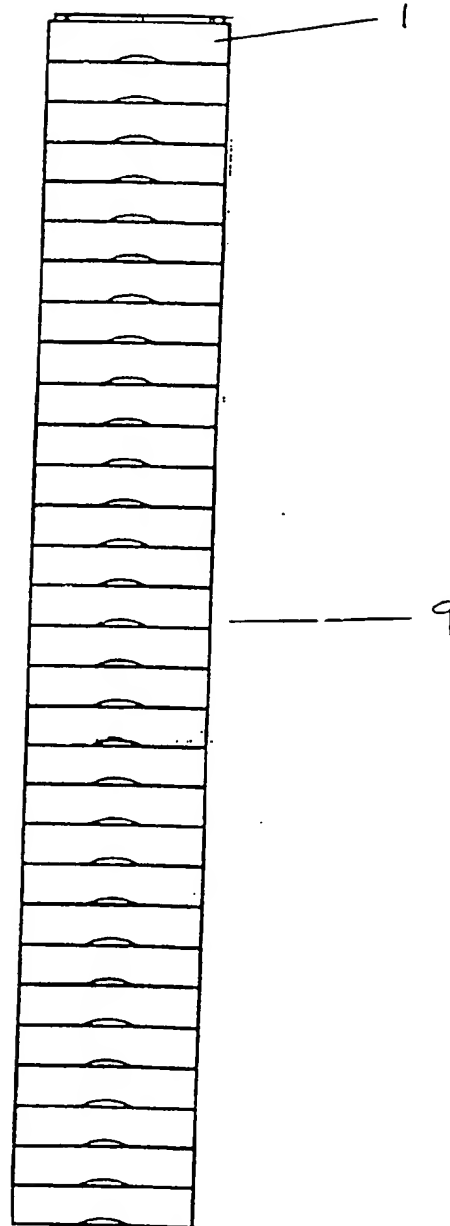


Fig 9

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 98/02644

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 B65D21/02 A45C11/00

According to International Patent Classification (IPC) or to both national classification and IPC

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Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B65D A45C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	CH 537 838 A (BEIERSDORF A.G.) 31 July 1973 see column 1, line 23 - column 2, line 44; figures 4-6	1,2,4,5, 10,11,13 3,6,7
X A	US 2 940 589 A (SILVERMAN) 14 June 1960 see column 2, line 21 - line 67; figures 1,2	1,3-5, 8-13 2,6,7
X A	US 4 429 786 A (HUCAL) 7 February 1984 see column 4, line 35 - column 6, line 25; figures 1-3	1,3-5, 8-13 2,6,7
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

26 November 1998

Date of mailing of the international search report

09/12/1998

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# INTERNATIONAL SEARCH REPORT

Int. onal Application No

PCT/GB 98/02644

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	FR 2 685 290 A (BLANIE) 25 June 1993 see page 3, line 10 - page 4, line 9; figures 1-4	1,4,5, 10,11,13 2,3,6,7
X A	US 2 645 375 A (TÖPFER) 14 July 1953 see column 1, line 42 - column 2, line 17; figures 1-6	1,3-5, 10,11,13 2,6,7
X A	BE 817 042 A (SOVEDAG) 16 October 1974 see page 6, line 25 - page 7, line 13; figures 7-10	1-5,10, 11,13
X A	DE 84 05 191 U (SCHEEPE) 19 April 1984 see page 3; figure 1	1,3-5, 10,11,13 2,6,7

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB. 98/02644

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